

## CLEAN COPY OF THE CLAIMS

1. A method for dewatering biological sludge that has been digested by a thermophilic digestion process comprising:
  - (a) adding at least one polymeric quaternary ammonium compound, as a primary component, to the biological sludge;
  - (b) adding at least one polyacrylamide to the biological sludge;
  - (c) coagulating the biological sludge to form microflocs whereby said at least one polymeric quaternary ammonium compound functions as a primary component in forming microflocs; and
  - (d) flocculating the microflocs with said at least one polyacrylamide such that the combination of the polymeric quaternary ammonium compound and of the polyacrylamide enhances dewatering of the sludge.
2. The method for dewatering biological sludge according to claim 1, wherein the polymeric quaternary ammonium compound is from the di-allyl di-methyl ammonium chloride (DADMAC) family.
3. The method for dewatering biological sludge according to claim 1, wherein the polymeric quaternary ammonium compound is from the epichlorohydrin di-methyl

amine (epi-DMA) family.

4. The method for dewatering biological sludge according to claim 1, wherein said at least one polymeric quaternary ammonium compound is added directly to the sludge and, upon formation of microflocs of the sludge from said at least one polymeric quaternary ammonium compound, wherein said at least one polyacrylamide is a cationic polyacrylamide and is added to form a floc that dewateres the sludge.
5. The method for dewatering biological sludge according to claim 4, wherein the polymeric quaternary ammonium compound and the cationic polyacrylamide are in an approximately 1:1 ratio (by weight), with the cationic polyacrylamide having a higher molecular weight than the polymeric quaternary ammonium compound does.
6. The method for dewatering biological sludge according to claim 4, wherein the ratio of said at least one polymeric quaternary ammonium compound with respect to said at least one cationic polyacrylamide range from about 1:10 to about 20:1 (by weight).
7. The method for dewatering biological sludge according to claim 4, wherein the polymer concentrations to solids ratio of total polymer dosage requirement in

15 (8)

relationship to percentage of solids component of the sludge is between about 50 ppm:1 percent and about 300 ppm:1 percent.

8. The method for dewatering biological sludge according to claim 1, wherein the polymeric quaternary ammonium compound is added directly to the sludge, in an amount sufficient to cause formation of a cationic overcharge within a developed microfloc system, and an anionic polyacrylamide is then added for final floc formation.
9. The method for dewatering biological sludge according to claim 1, wherein the polymeric quaternary ammonium compound is added directly to the sludge, in an amount sufficient to cause formation of a cationic overcharge within a developed microfloc system, and an anionic polyacrylamide is then added for final floc formation.
10. The method for dewatering biological sludge according to claim 8, wherein the polymeric quaternary ammonium compound and the anionic polyacrylamide are in an approximate 10:1 ratio (by weight), with the anionic polyacrylamide having a higher molecular weight than the polymeric quaternary ammonium compound.
11. The method for dewatering biological sludge according to claim 10, wherein the

anionic

polyacrylamide is about 40% anionic.

12. The method for dewatering biological sludge according to claim 8, wherein the ratio of said at least one polymeric quaternary ammonium compound to the anionic polyacrylamide range from about 1:10 to about 20:1 (by weight).
13. The method for dewatering biological sludge according to claim 8, wherein the polymer concentration to solids ratio of total polymer dosage requirement in relationship to percentage of solids component of the sludge is between approximately 50 ppm:1 percent and approximately 300 ppm:1 percent.
14. The method for dewatering biological sludge according to claim 1, wherein the biological sludge is mixed with primary sludge.
15. A composition for dewatering biological sludge that has been digested by a thermophilic digestion process according to claim 1 comprising at least one polymeric quaternary ammonium compound, as a primary component, and polyacrylamide, said components being present in the composition in a ratio to enable the at least one ammonium compound to function as a primary component in forming microflocs for the biological sludge and the composition to function as an agent for dewatering

biological sludge from a thermophilic digestion process.

16. The method for dewatering biological sludge according to claim 1, wherein the polyacrylamide and said at least one polymeric quaternary ammonium compound are used in solution or in dry form.
19. The method of claim 1 wherein the polyacrylamide is cationic or anionic.
21. The composition of claim 15 wherein the polyacrylamide is cationic or anionic.

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